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Dear Kimberley,

re: Trees and Proposed Building Works at St Columba`s College Essendon

Introduction
Building works are proposed at St Columba`s College Essendon, as per the site plan drawing No. 20061 TP1.000 by CHT Architects. Galbraith and Associates recently provided a report dated the 12/April/22 for Fontic on the English Oak in the vacant block of land which abuts the south-east corner of the intersection of Buckley and Lorraine Street. We have now been requested to discuss other trees close to the proposed works as detailed on the accompanying copy of the demolition plan 20061 TP0.120 on page 2.

The Trees – General
The trees within the area of works, apart from the previously reported on oak, consist of two Chinese Elms of approx. 20 years of age (trees 1 and 2), a row of 3 slightly older Silver Tarata (trees 3-5) and a row of young Evergreen Magnolia (row 11). Tree 1 is in poor condition with little foliage and dead extremities. I assume this is related to the small soil volume the roots have to exploit within the retaining walls surrounding the tree. Tree 2 is also bounded by retaining walls but the soil volume is considerably larger. Even here however I expect that within 10 years the tree will be stunted and struggling due to root confinement. The Silver Tarata may once have performed a useful screen function but with removal of their lower crowns, along with the odd tree, provide relatively low amenity.

The remaining trees are located in the Buckley and Lorraine streets nature strips. They are mainly young small Jacarandas in fair-good condition of 4-15 years of age. Tree 6 in Buckley Street is a mature Snow in Summer Paperbark of approx. 50 years of age. It has reached its maximum height and spread of 6m by 8m and is in fair-good condition.

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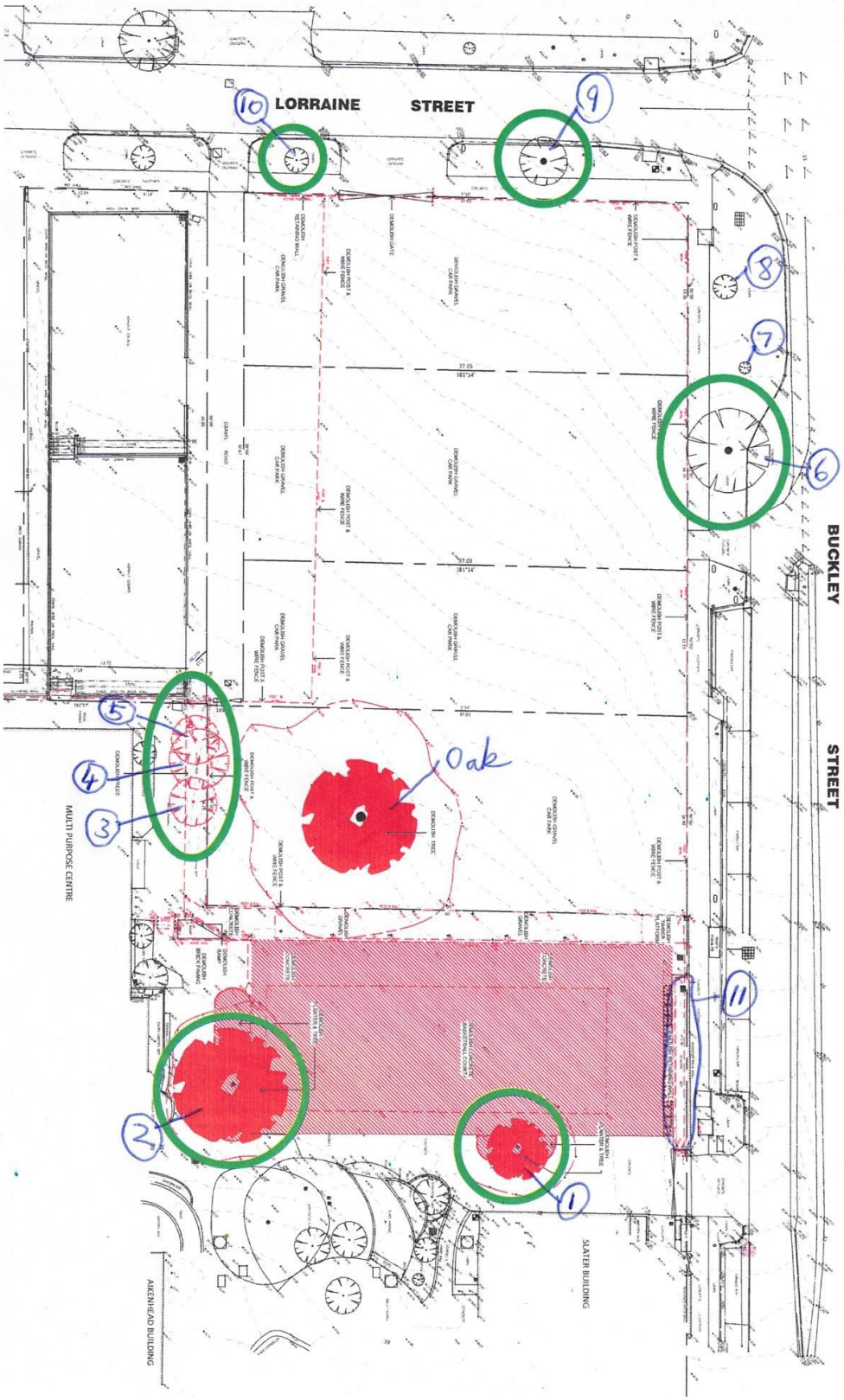


The Trees

Tree No.	Species	Origin	DBH (cm)	HxS (m)	Condition	WOR	SULE (yrs)	Comments, TPZ(m), SRZ(m)
1	Ulmus parvifolia (Chinese Elm)	E	33	8x12	Poor	3	5	Very thinly foliated, die-back, inadequate soil volume available in the planter. TPZ 4 SRZ 2.2
2	Ulmus parvifolia (Chinese Elm)	E	42	10x13	Fair-good	6	20	TPZ 5 SRZ 2.5
3	Pittosporum eugenioides 'Variegatum' (Silver Tarata)	E	12, 13	7x5	Fair	4	15	Part of row of screen trees which have lost their screening function in the lower parts. TPZ 2 SRZ 1.5
4	Pittosporum eugenioides 'Variegatum' (Silver Tarata)	E	16, 15	7x5	Fair	4	15	Part of row of screen trees which have lost their screening function in the lower parts. TPZ 2.6 SRZ 1.8
5	Pittosporum eugenioides 'Variegatum' (Silver Tarata)	E	22	7x5	Fair	4	15	Part of row of screen trees which have lost their screening function in the lower parts. TPZ 2.6 SRZ 1.8
6	Melaleuca linariifolia (Snow in Summer)	A	35, 25, 25, 32, 20	6x8	Fair-good		20	Mature street tree whose crown overlaps the subject site by 1m. TPZ 7.5 SRZ 2.9
7	Jacaranda mimosifolia (Jacaranda)	E	3	2x1	F		50	Stunted 4 year old street tree.
8	Jacaranda mimosifolia (Jacaranda)	E	10	4x4	G		50	Healthy young street tree ~ 7 years old.
9	Jacaranda mimosifolia (Jacaranda)	E	18	6x6	G		50	Healthy young street tree ~ 15 years old. TPZ 2.2 SRZ 1.7
10	Jacaranda mimosifolia (Jacaranda)	E	9	4x4	G		50	Healthy 4 year old street tree. TPZ 2 SRZ 1.5
11	Magnolia grandiflora (Bull Bay Magnolia dwarf cultivar)	E	~ 8	4x2	G	4	40	Row of young healthy evergreens. TPZ 2 SRZ 1.5

Impact of the Proposal

Site Trees It is proposed to remove trees 1 – 5, all of which are within the school site. Apart from the oak, Tree 2 is the only tree which requires a permit to remove under the local law.

Street Trees Trees 7-10 can be readily retained under this proposal – no works are proposed within their tree protection zones (TPZs) as determined according to the relevant Australian Standard 4970:2009 'Protection of trees on development sites'.

Tree 6 is potentially at risk from the construction of the masonry fence along the Buckley Street frontage. The centre of the trunk is 3.4m from the property frontage, thus well outside the indicative structural root zone (SRZ) of 2.9m radius as determined according to the Aust Std. but well within the TPZ of 7.5m radius. I would suggest however that the tree was likely to readily cope with excavation along the property frontage for strip foundations. The TPZ is calculated purely from trunk thickness and in the case of this species, which has abnormally thick trunks relative to overall size, the size of the TPZ is unnecessarily considerably inflated. Furthermore the trenching is only a metre inside the dripline of the tree.

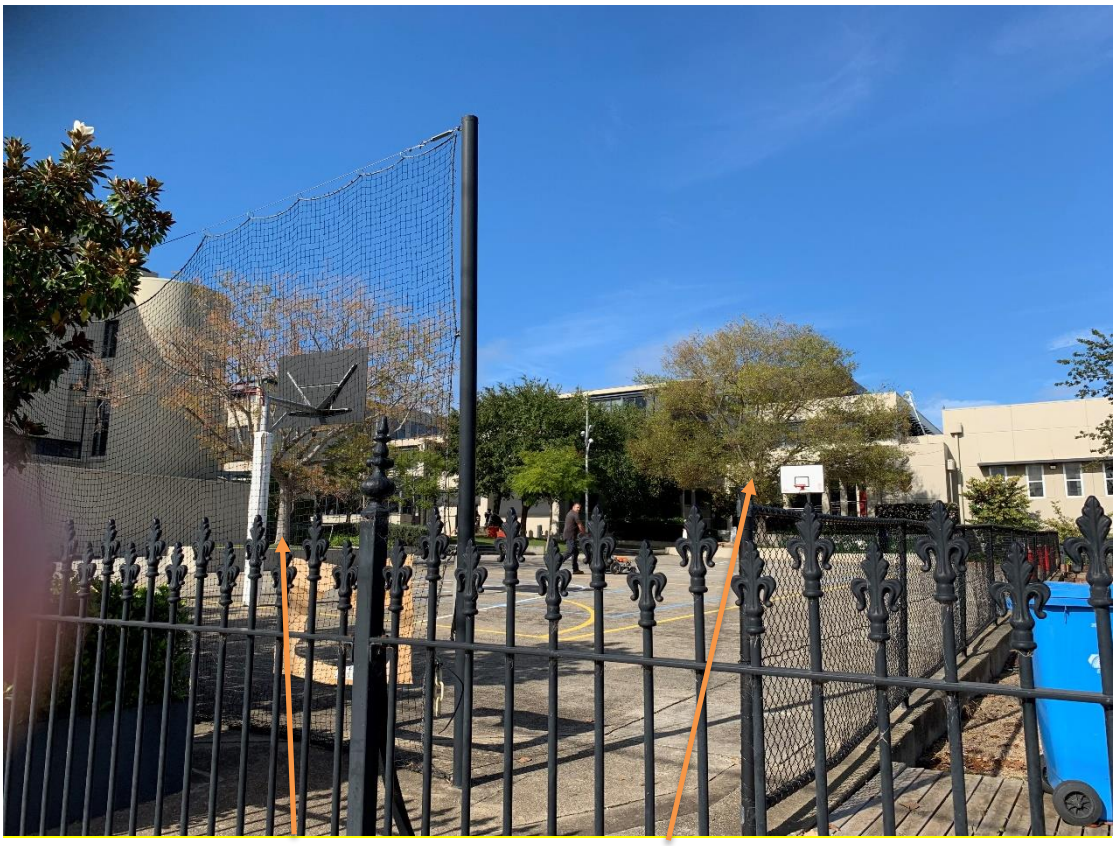
If necessary, as a condition of permit, the route of the proposed footing can be hydro-excavated to the necessary founding depth for a length of 8m opposite the tree (4m east and west of the trunk centre). If significant root development is encountered, the loss of which is judged to adversely impact on the safe useful life of the tree, the roots of concern could be bridged over.

With respect to the row of young magnolias, row 11, the proposal should be able to retain them. The levels along the north side of the new building should follow the existing grading. The new path needs to be at grade. The new fence along the boundary will consist of pillars with infil panels which will not require strip footings and which are to be at grade.

Summary

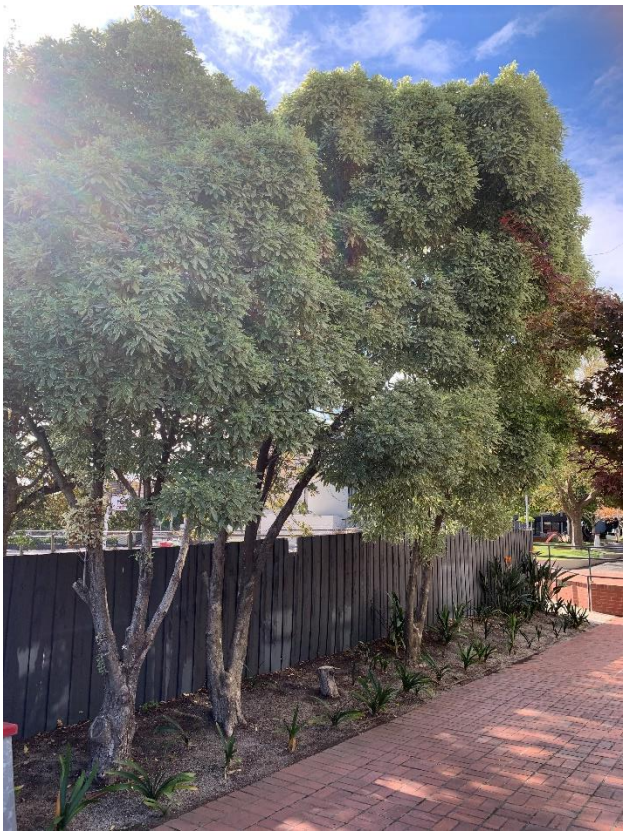
Most of the trees proposed to be removed are of low worth. There are two trees only which require a permit under the local law, both of which are commonly occurring exotics in fair-good condition. One of these, the oak, has been reported on previously. The other is tree 2, a Chinese Elm which is likely to get too large for the confined soil volume which appears to be available to it over the next ten years or so.

The street trees can easily be protected from the proposed works.



Tree 2

Tree 2



Trees 3-5

Tree 6


8
7


9
10

Row 11

Notes on Terminology
In order to understand the column headings of the tables of data, I have provided the following explanations:

DBH diameter of trunk over bark at breast height In a number of cases where the tree has forked into multiple trunks below breast height (1.3-1.5m) the diameter is measured below the fork and an estimate is made for the single trunk equivalent at breast height, or else figures for each of the individual stems can be given.

HxS This is the estimated height (H) of the tree and its average crown spread (S).

SULE Safe useful life expectancy in years. Taken in the context that the area is to be developed for residential use, and that sensible distances are maintained between the buildings and the trees, this is the estimate of time that the tree will continue to provide useful amenity without imposing an onerous financial burden in order to maintain relative safety, and avoid excessive nuisance.

Worthiness of Retention (WOR):
The worth for retention of a tree is based on the assumption that the site is to be re-developed, and that there is the opportunity for new tree planting. It is based on a number of factors. These factors are:

1. structure, health, form and safe useful life expectancy,
2. size, prominence in the landscape,
3. species rarity,
4. whether indigenous,
5. whether an environmental weed.
6. importance for habitat of native wildlife
7. whether of historical or cultural interest

Any tree with a WOR rating of 3 or less should be seriously considered for removal before development begins because it is dead, nearly dead or dangerous, a weed, is causing or is likely to cause a severe nuisance in the near future, or just of very little significance and readily replaceable with new plantings. Trees rated 4-6 are of some significance. Some of these trees may respond to treatments such as formative pruning, removal of dead wood, weight reduction pruning etc. Trees rated 7 or higher are of high significance (the higher the ranking the more so), primarily because of their good health, structure, form, prominence in the landscape and SULE, although all they still may need substantial works done on them as already detailed, if they are to be retained.

Tree Protection Zone (TPZ) According to the Australian Standard AS 4970-2009 'Protection of Trees on Building Sites', the TPZ is the principal means of protecting trees on development sites. It is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable.' The radius of the TPZ is calculated by multiplying the DBH by 12. The radius is measured from the centre of the stem at ground level. An area of 10% of the TPZ is deemed acceptable to violate if 10% of the ***area*** of the TPZ is made up in other directions. *Thus if encroachment is from one side only, encroachment to as close as approximately 8.3 times the DBH (~ 69% the listed TPZ radius) is acceptable according to the Standard.*

The AS 4970-2009 should only be construed as a rough guide. It is only used in this statement because various local authorities now demand it in their assessments of development applications. Many factors such as the type of encroachment on the TPZ, species tolerance, age, presence of spiral grain, soil type, soil depth, tree lean, the existence of onsite structures or root directional impediments, level of wind exposure, irrigation and ongoing tree care and maintenance are each highly influential on the size and success of the TPZ estimation, therefore the figures derived from the Standard and provided in this report must be treated as rough guides only.

Structural Root Zone
According to the Aus Std. AS 4970:2009, the structural root zone is the area of the root plate required for a tree`s stability. In order to calculate the indicative radius of such a zone from the trunk centre, according to the Aus Std., one uses the following formula: SRZ radius is $(D \times 50)^{0.42} \times 0.64$, where D is the trunk diameter in metres taken from just above the root buttress. The minimum indicative SRZ radius is 1.5m for any tree, irrespective of how small. A graph is provided in the Aust Std, with a curve depicted relating the SRZ to trunk diameter. Unfortunately, the calculated figures do not match those derived from the graph. The Aust Std. does not mention from where this formula is taken although acknowledges the publication 'Mattheck, C. & Breloer, H. (1994) *The Body Language of Trees* HMSO Publications' in the preface and bibliography. The figures derived from the graph for the indicative SRZs are far greater than those implied from the curve of 95% fit for the results from studies of upturned root plates of windblown and winched over German trees (see Mattheck, C. & Breloer, H. (1994). Furthermore the figures derived from the graph for the indicative SRZs are far greater than what one calculates them to be, using the formula provided by the Standard i.e. $(D \times 50)^{0.42} \times 0.64$. The calculated figures according to the Aust Std. are considerably greater for small and large trunks than those of Mattheck & Breloer.

In reality, the radii calculated whether by graph or using the formula, are much larger than necessary, except in cases such as where the soils are very shallow or where the structural root development is unidirectional or highly asymmetric for some reason, and the excavation is to be within the zone of the roots. **The structural stability generally depends far more on what proportion of the circumference of the tree is to be excavated than the actual distance of excavation from a tree, and this is often not taken into account quite when using the SRZ.**

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